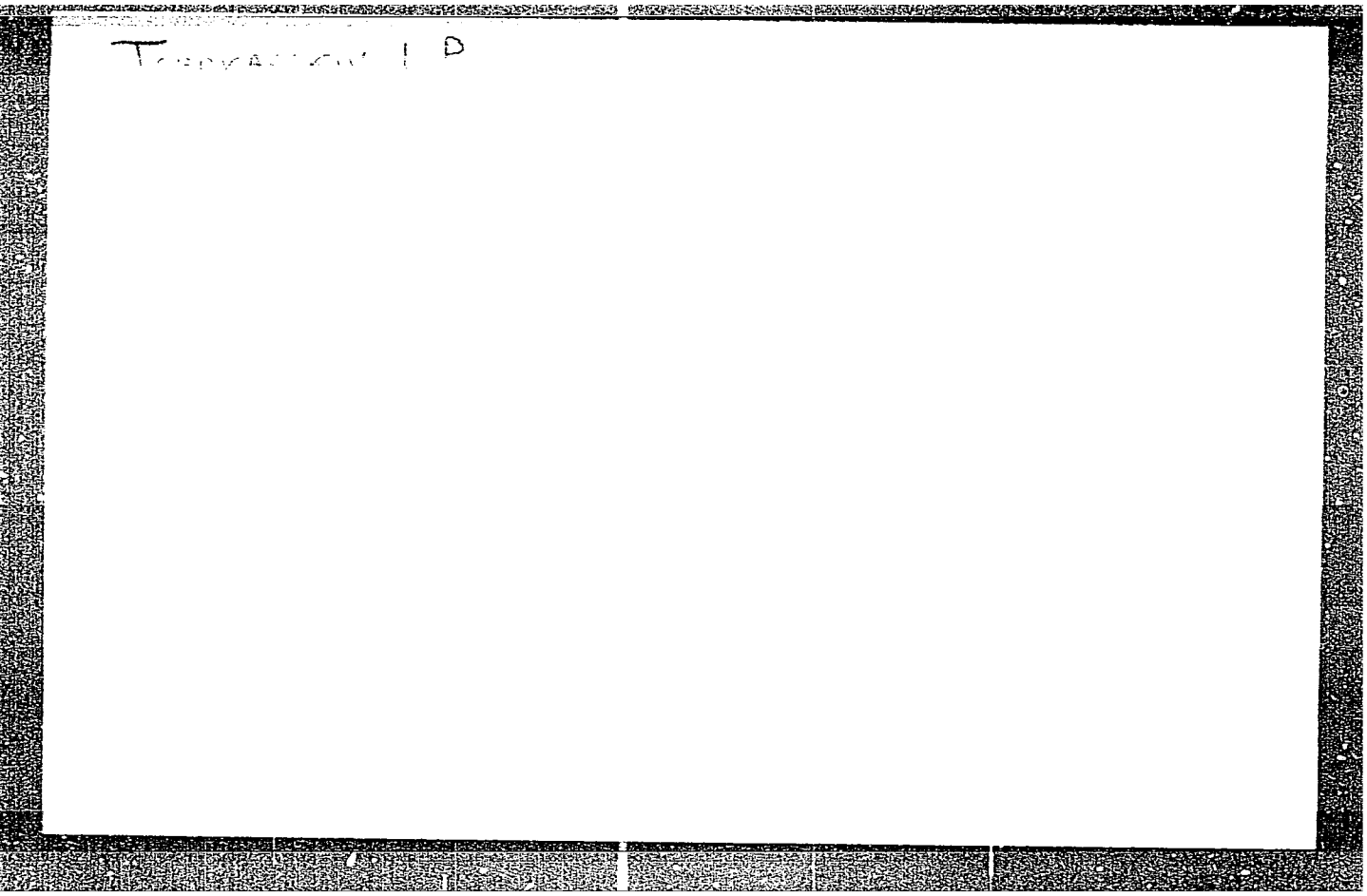
TSERKASOV, I. D. (Murmansk, oblastnoi, Glavpochtamt, SSSR.)

Example of the homogeneous diffusion process in the space and time.
Cas pro pes mat 86 no.3:367-371 '61.



ZEMLYANSKIY, N.I; PRIB, O., student IV kursa; SHARYPKINA, M., student IV kursa; KOSTENKO, A., student III kursa; GLUSHKO, A., student III kursa; KOZHEVNIKOVA, O., student III kursa; KRASILOVSKAYA, T., student III kursa; SEREDA, N., student III kursa; PINTOVA, N., student III kursa; TSERKEVICH, G., student III kursa; SHAPKA, V., student III kursa

Condensation of aromatic hydrocarbons with halogen derivatives of aldehydes. Nauk. zap. L'viv. un. 13:129-135 '49.
(MIRA 12:10)

1.Kafedra organicheskoy khimii L'vovskogo gosudarstvennogo universiteta im. I. Franko.
(Hydrocarbons) (Aldehydes)

TSERKOVER, E.

Thought, experiment, plan, and factory. Nauka i zhizn' 28 no.12:74-76 D '61. (MIRA 15:2)
(Polymers)

USPENSKIY, Ye.A.; TSERKOVICH, L.T.

Pathomorphological diagnosis of congenital toxoplasmosis. Zhur. nevr. i psikh. 60 no.3:315-318 '60. (MIRA 14:5)

1. Kafedra patologicheskoy anatomii (zav. - prof. Ye.A.Uspenskiy) Odesskogo meditsinskogo instituta imeni N.I.Pirogova.
(TOXOPLASMOSIS)

TSERKOVICH, L.T.; SAFRONOVA, O.N.

Pathological anatomy and pathogenesis of Cooley's anemia. Vrach. delo no.9:129-134 S '61. (MIRA 14:12)

1. Kafedra patologicheskoy anatomii (zav. - prof. Ye.A.Uspenskiy) i klinika detskikh bolezney (zav. - prof. V.P.Chernyuk) Odesskogo meditsinskogo instituta imeni N.I.Pirogova.
(ANEMIA)

TSERKOVITSKAYA, I.A.; KUSTOVA, N.A.

Amperometric determination of V^{4+} and V^{3+} when they are present simultaneously. Vest. LGU 15 no.16:148 '60. (MIRA 13:8)
(Vanadium--Analysis)

TSERKOVNAYA, L. N.

TSERKOVNAYA, L. N.: "The state of the cardiovascular system in chronic pneumonia of children." First Moscow Order of Lenin Medical Inst imeni I. M. Sechenov. Moscow, 1956. (DISSERTATION FOR THE DEGREE OF CANDIDATE IN MEDICAL SCIENCE).

Knizhnaya letopis'
No. 23, 1956. Moscow.

TSERKOVNAYA, L. N. Cand Med Sci --(diss) "Condition of the cardiovascular system during chronic pneumonia in children." Mos, 1958. 12 pp (1st Mos Order of Lenin Med Inst im I. M. Sechenov), 200 copies (KL, 14-58, 118)

TSERKOVNAYA, L. N., SHKRUDNEVA, I. F.

Rheumatism

Prognostic significance of rheumatic nodules in children. Pediatriia No. 4, 1952.

9. Monthly List of Russian Accessions, Library of Congress, December 1952 1953, Uncl.

TSERKOVNAYA, L. N., SHKRUDNEVA, I. F.,

Rheumatism.

Prognostic significance of rheumatic nodules in children. Pediatriia no. 4, 1952.

9. Monthly List of Russian Accessions, Library of Congress, December 1953 Uncl.

TSERKOVNAYA, L. N., SHKRUDNEVA, I. F.

Rheumatic Heart Disease

Prognostic significance of rheumatism nodules in children. Pediatriia no. 4, 1952.

9. Monthly List of Russian Accessions, Library of Congress, December 1953 Uncl.

TSERKOVNAYA, L. N., SHKRUDNEVA, I. F.

Rheumatic Heart Disease

Prognostic significance of rheumatism nodules in children. Pediatriia No. 4, 1952.

9. Monthly List of Russian Accessions, Library of Congress, December 1952 1952, Uncl.

TSERKOVNAYA, L. N., SIMRUDNEVA, I. F.

Children - Diseases.

Prognostic significance of rheumatic nodules in children. Pediatriia, No. 4, 1952.

9. Monthly List of Russian Accessions, Library of Congress, December 1953, Uncl.

TSERKOVNAYA L. N.

TSERKOVNAYA, L.N.

Condition of the cardiovascular system in chronic pneumonia in children [with summary in English]. Pediatriia 36 no.1:55-59 Ja '58. (MIRA 11:2)

1. Iz kliniki detskikh bolezney (zav. kafedroy - dyystvitel'nyy chlen AMN SSSR prof. Yu.F.Dombrovskaya) I Moskovskogo ordena Lenina meditsinskogo instituta imeni I.M.Sechenova.
(CARDIOVASCULAR SYSTEM) (PNEUMONIA)

TSERKOVNAYA, L. N., SHRUDNEVA, I. F.

Children - Diseases

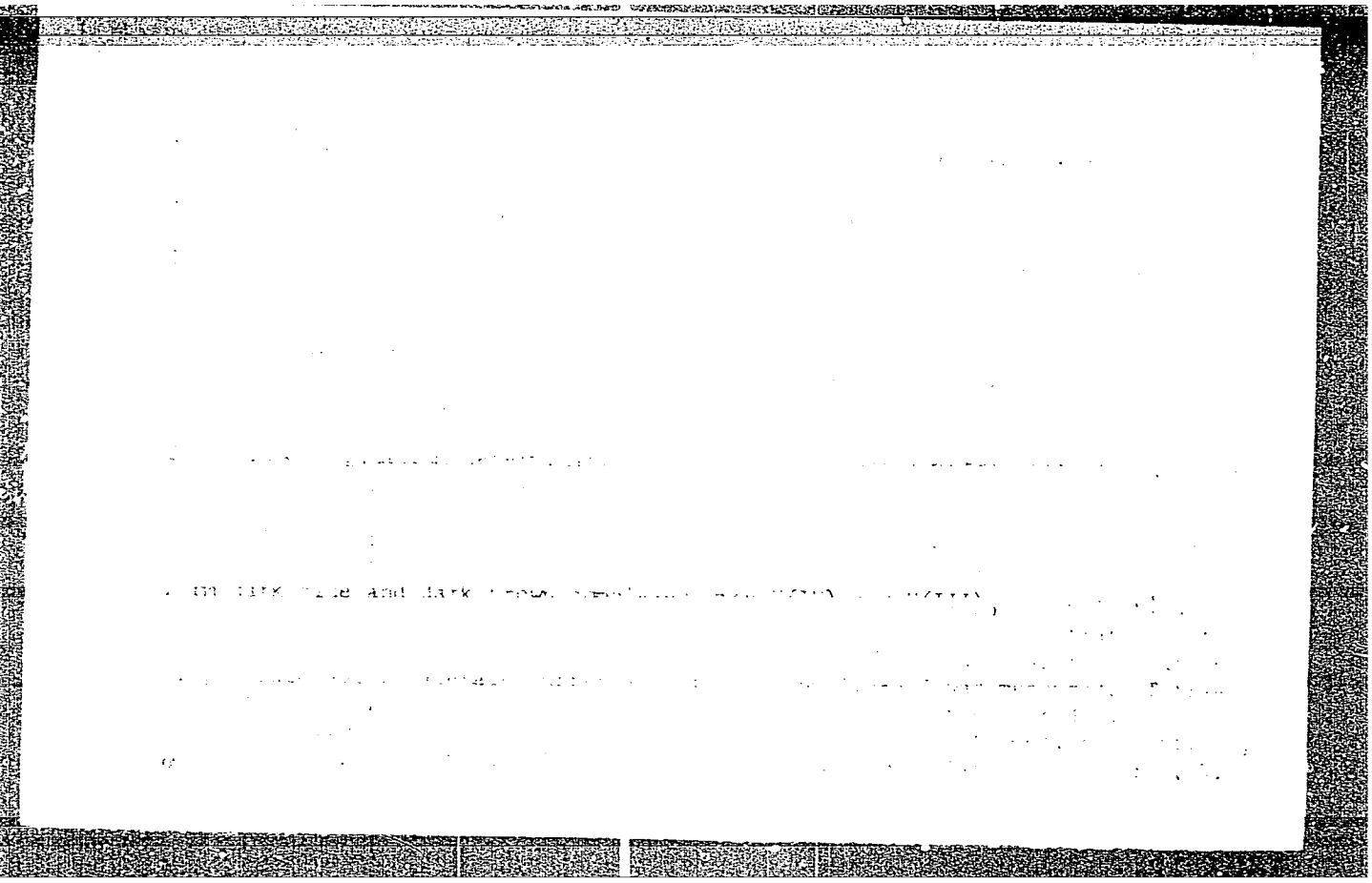
Prognostic significance of rheumatic modules in children. Pediatriia, No. 4, 1952.

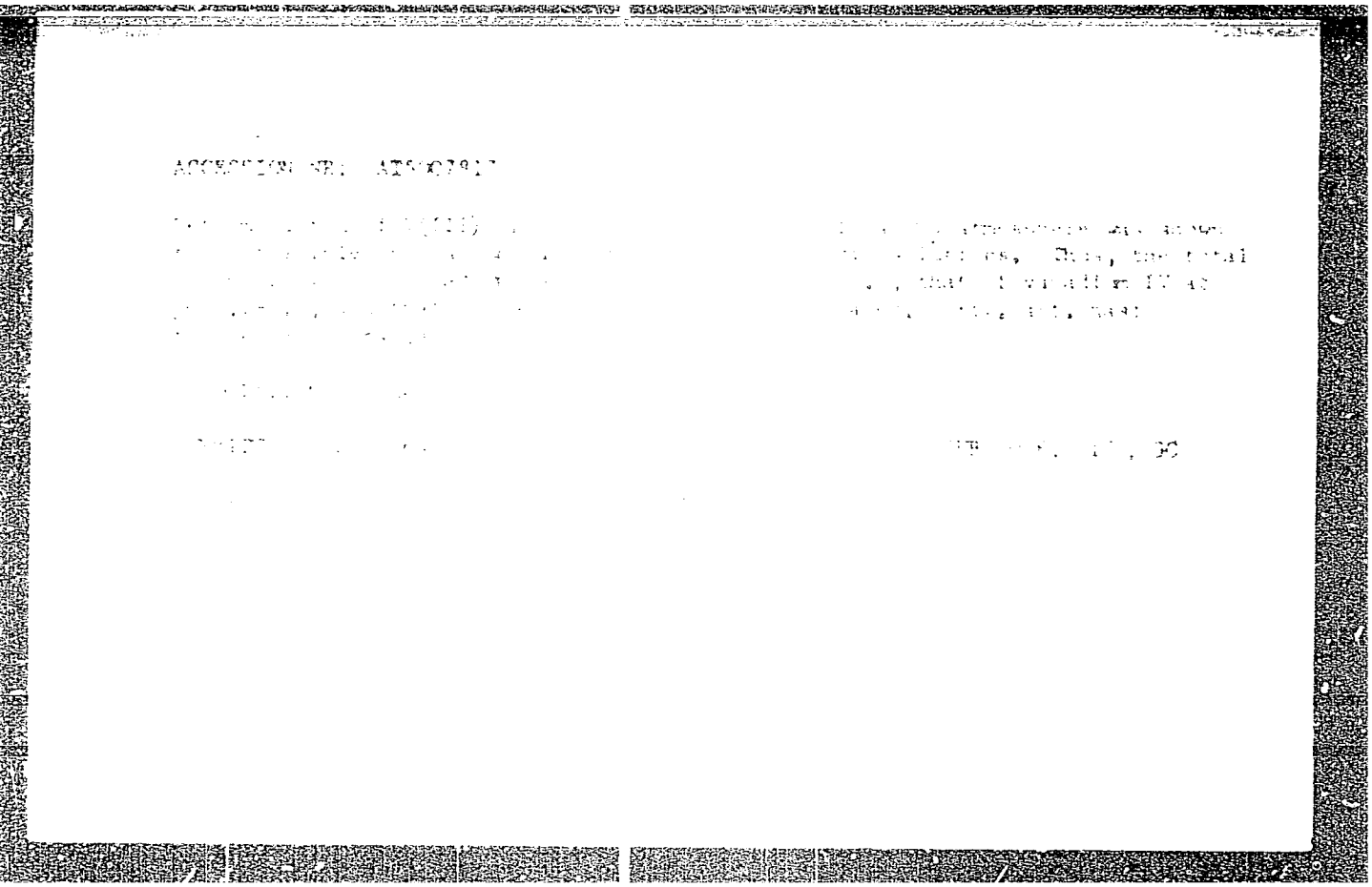
9. Monthly List of Russian Accessions, Library of Congress, December 1952 1953, Uncl.

BEREZIN, M.; KAL'MANSON, G., ekonomist; TSERKOVNIKOV, A., ekonomist.

Some simplifications in the journal-voucher form of bookkeeping
Bukhg.uchet 15 no.10:38-47 O '56. (MLRA 9:11)

1. Rukovoditel' gruppy ratsionalizatsii i mekhanizatsii ucheta Ministerstva tsvetnoy metallurgii SSSR (for Berezin).
(Accounting)





L 26242-65
ACCESSION NR: AT5007819

AUTHOR: Tserkovnitskaya, I. A.; Komolova, N. C.

TITLE: Amperometric determination of niobium, tantalum and titanium

SOURCE: Leningrad. Universitet. Metody kolichestvennogo opredeleniya elementov (Methods for the quantitative determination of elements). Leningrad, Izd-vo Leningr. univ., 1964, 77-83

TOPIC TAGS: niobium determination, tantalum determination, titanium determination, pyrocatechol, amperometric titration, polarographic oxidation, loparite analysis

ABSTRACT: A method was developed for amperometric titration of niobium, tantalum and titanium with pyrocatechol solution. The polarographic oxidation behavior [illegible] various phenols was determin-

Card 1/2

L 36247-65
ACCESSION NR: AT5007818 0

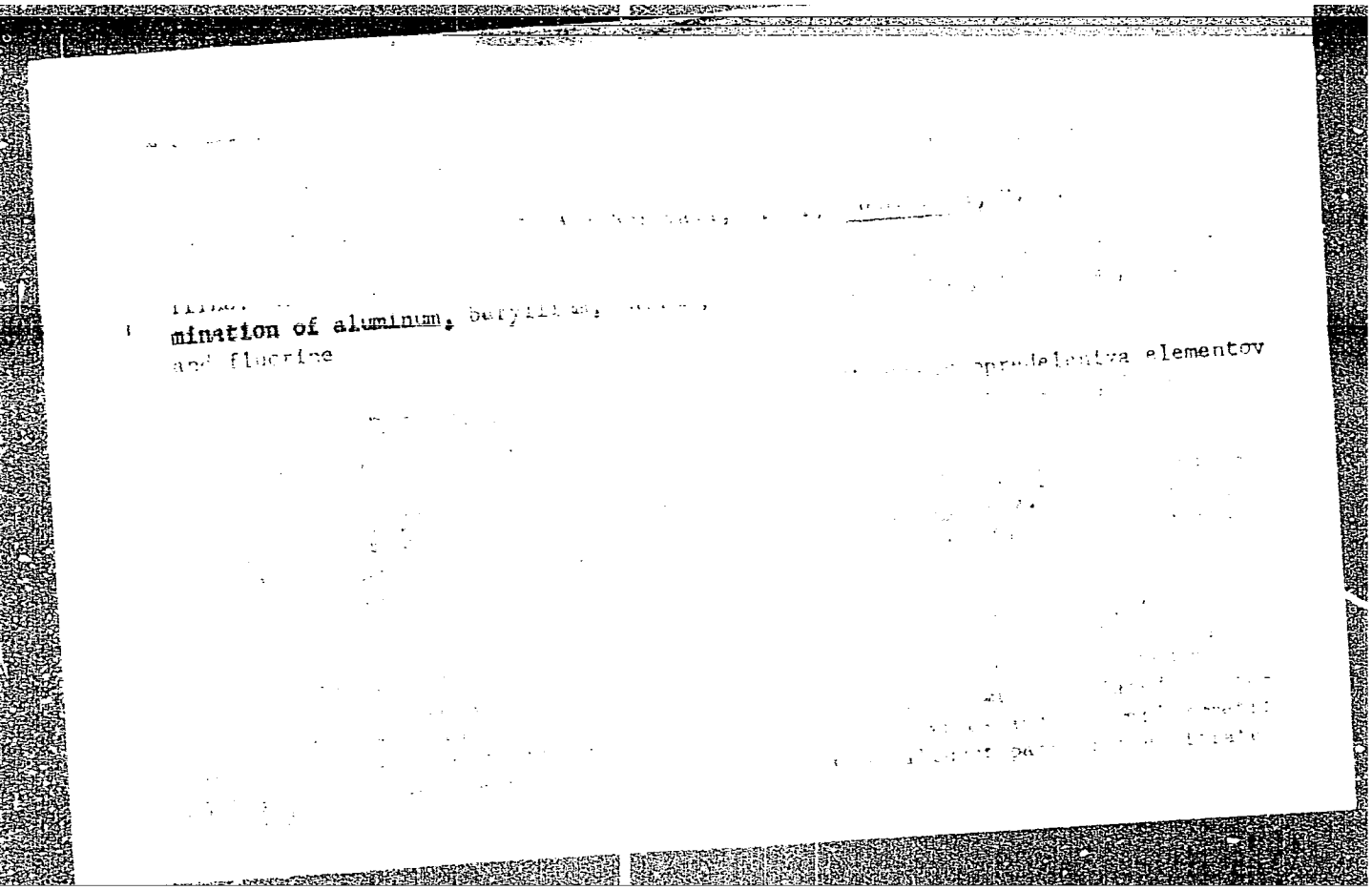
error, while 12.8-51.0 μg Nb and 22.8-114 μg Ta were determined at pH 7.5-8 and pH 2.5-2.7, respectively, with maximum relative errors of approximately 3%. Tantalum and niobium in mixtures with titanium were titrated at pH 2.7 and 8, respectively, after complexing of titanium with Trilon B. The method was used for determining Ti, Nb and Ta in loparite, and the results were found to be in good agreement with values obtained by determination of Nb + Ta with tannic acid and by gravimetric determination of Ti. Orig. art. has: 11 tables and 1 formula.

ASSOCIATION: none

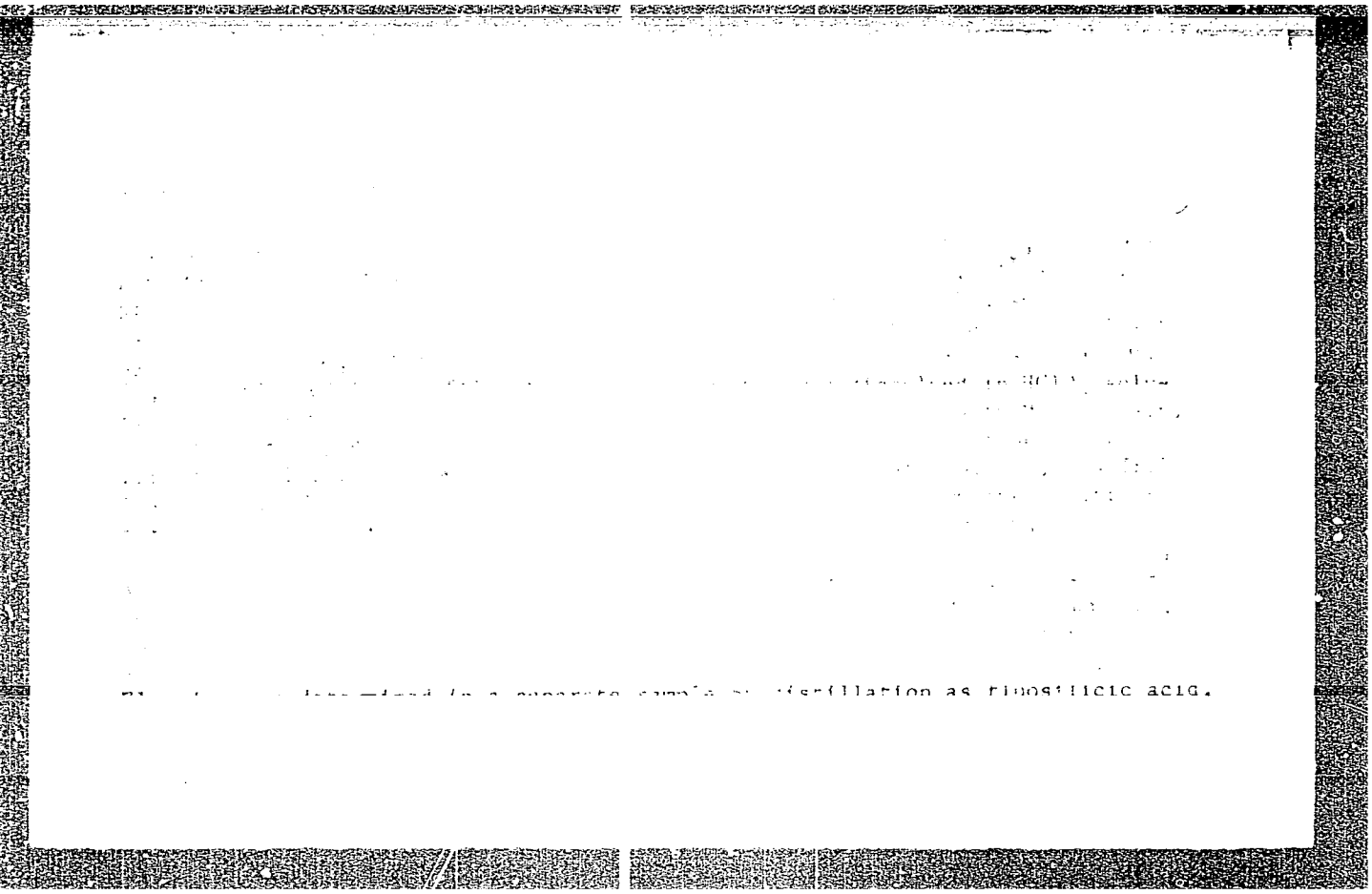
SUBMITTED: 28Sep64 ENCL: 00 SUB CODE: IC ,GC

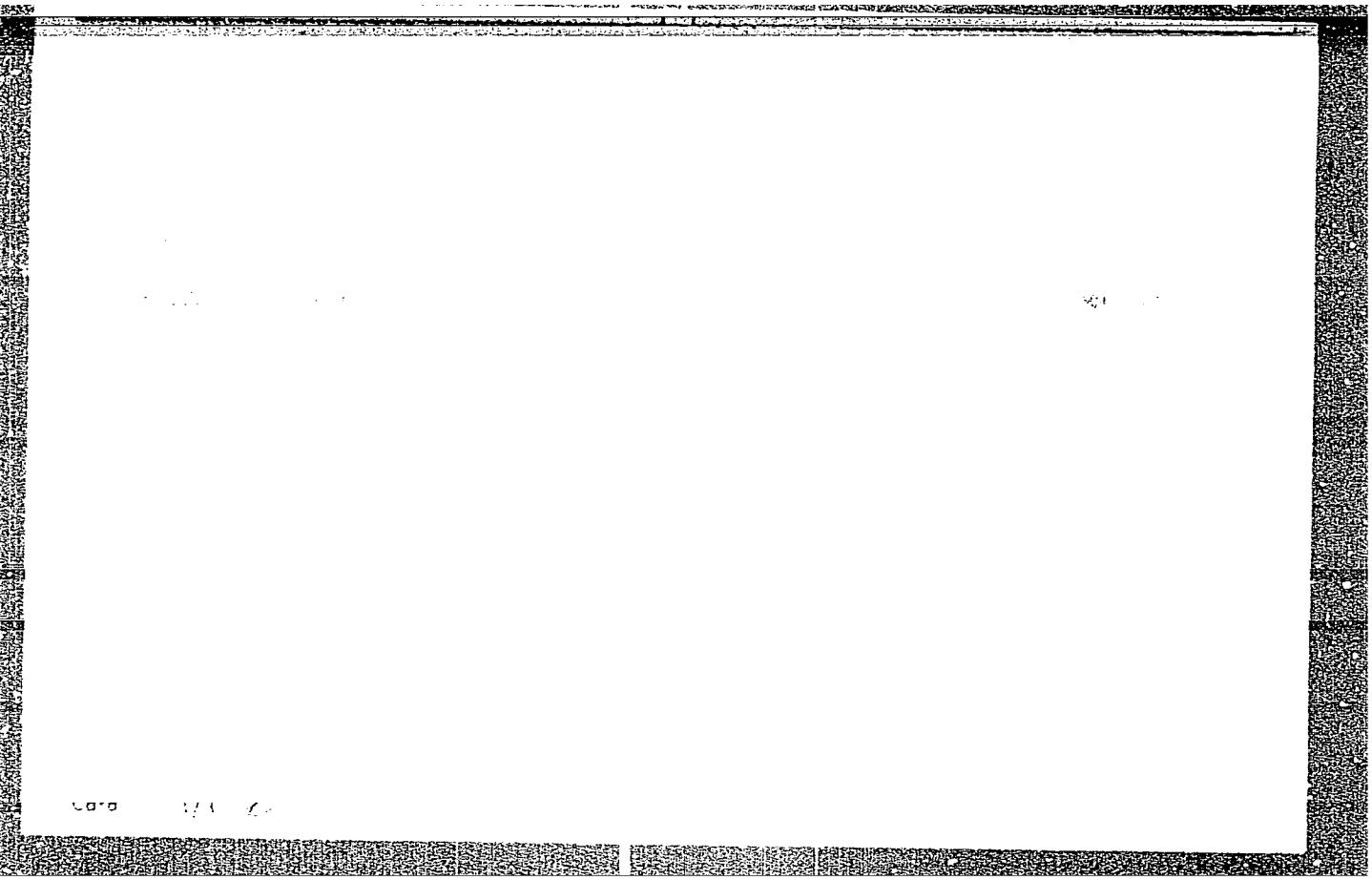
NO REF SOV: 003 OTHER: 001

Card 2/2



mination of aluminum, beryllium,
and fluorine





APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001757010010-9"

ACCESSION NR: AT5007823 S/0000/64/000/000/0101/0106

AUTHOR: Tserkovnitskaya, I. A.; Bykhovtseva, T. T.

TITLE: Extractive separation of uranium with macromolecular amines

SOURCE: Leningrad. Universitet. Metody kolichestvennogo opredeleniya elementov (Methods for the quantitative determination of elements). Leningrad, Izd-vo Leningr. univ., 1964, 101-106

TOPIC TAGS: uranium separation, macromolecular amine, uranium determination, volumetric analysis, photometric analysis, luminescence analysis, diethyldithiocarbamate complex, Arsenazo complex

ABSTRACT: The separation of uranium from accompanying elements by extraction with 0.1 M solutions of isooctylbenzylamine or tri-n-octylamine in benzene or carbon tetrachloride and the determination of uranium in the presence of various cations and anions was studied. U was extracted from uranyl sulfate solutions with amine solution and the effect of interfering elements was eliminated by addition of Trilon B, reextraction with an appropriate solvent and determination [illegible], volumetric analysis with trilon B, [illegible] by analysis of the diethyldithiocarbamate complex [illegible] luminescence technique. The methods gave

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L 36261-65

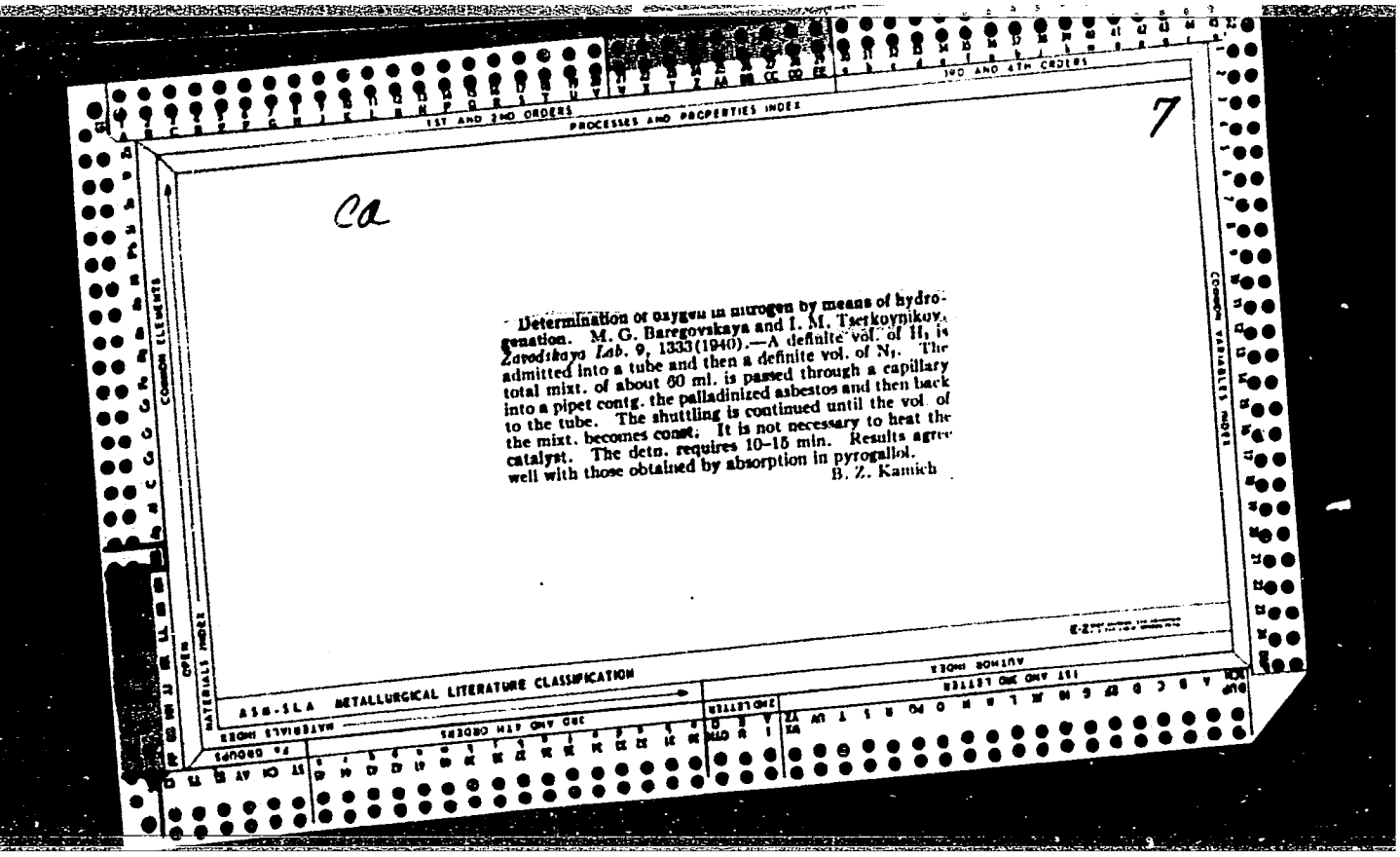
ACCESSION NR: AT5007823

good reproducible and accurate results with mixtures containing Fe, Al, Ti, V, Th, Zr, Mn, Cu, Cr, and/or Zr. The necessity to reextract the amine extracts was eliminated by complexing U(VI) with the reagent Arsenazo III, extraction with 0.1 M tri-n-octylamine in [illegible], and determination of U from the optical density of the Arsenazo complex. Effects of accompanying elements were eliminated by addition of Trilon B (to complex Zr, Al, Fe^{3+}, Ti, V, Mn^{2+} Cr^{3+}, Cu) and by extracting U from 0.1-1.2 M HCl and at pH 1 (to prevent extraction of rare earth elements). Orig. art. has: 1 tables, 2 figures and 1 formula.

ASSOCIATION: none

SUBMITTED: 28Sep64 ENCL: 00 SUB CODE: IC, GC

NO REF SOV: 002 OTHER: 004



Ca

7

Determination of oxygen in nitrogen by means of hydrogenation. M. G. Baregovskaya and I. M. Tsetkovnikov. *Zavodskaya Lab.* 9, 1333(1940).—A definite vol. of H_2 is admitted into a tube and then a definite vol. of N_2. The total mixt. of about 60 ml. is passed through a capillary into a pipet contg. the palladinized asbestos and then back to the tube. The shuttling is continued until the vol. of the mixt. becomes const. It is not necessary to heat the catalyst. The detn. requires 10–15 min. Results agree well with those obtained by absorption in pyrogallol.

B. Z. Kamich

TSERKOVNIKOV, Yu. A., Cand or Phys-Math Sci -- (diss) "Theory of microscopic stability of systems linked with far-acting forces." Moscow, 1957, 5 pp (Mathematics Institute im V. A. Steklov, AS USSR), 110 copies (KL, 30-57, 108)

TSERKOVNIKOV, Yu. A.

21-5-9/26

AUTHOR: Tserkovnikov, Yu.A. (Tserkovnykov, Yu.O.)

TITLE: On the Stability of a Plasma (Ob ustoychivosti plazmy)

PERIODICAL: Dopovidi Akademii Nauk Ukrains'koi RSR, 1957, Nr 5, pp. 461-465 (USSR)

ABSTRACT: The author investigated the stability of a plasma with respect to initial fluctuational disturbances in the stationary distribution functions $f_i(\vec{v}\,\vec{x})$ of the electric field E and magnetic field H in the case of high frequencies. Linearized Boltzmann equations without collision terms are used for the variations of the distribution function δf_i (where index i denotes plasma components). It is assumed that the intensity of the magnetic field H is high and the free path of particles composing the plasma is by far longer than the Larmor radius. The function is sought for $f(\vec{v}\vec{x})$ by expansion by inversed powers of the magnetic field H. The method proposed is demonstrated by an example of a system with an intermediate curvature of the magnetic field. The article contains 2 figures and 3 non-Slavic references.

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21-5-9/26

On the Stability of a Plasma

ASSOCIATION: Institute of Mathematics of the AN Ukrainian SSR (Instytut matematyky AN SRSR)

PRESENTED: By N.N. Bogolyubov (M.M. Boholyubov), Academician

SUBMITTED: 23 October 1956

AVAILABLE: Library of Congress

Card 2/2

TSERKOVNIKOV, Yu A.

PA - 2060

AUTHOR CERKOVNIKOV, JU.A.

TITLE Stability of Plasma in a Strong Magnetic Field (Ustojcivost' plasmy v sil'nom magnitnom pole).

PERIODICAL Zhurnal Eksperimental'noi i Teoret. Fiziki, 1957, Vol 32, Nr.1, pp 67-74 (U.S.S.R.)

Received 3/1957 Reviewed 4/1957

ABSTRACT BRUCKNER and WATSON, Phys.Rev. 102, 19 (1956) investigated some types of instability for the case that the density of plasma is low and that collisions can be neglected. Boltzmann's equations linearized on this occasion are used for the perturbations of the distribution functions without taking collisions into account. Such equations are also used by the author in this work, for he assumes that the processes leading to instability occur during a time that is essentially shorter than the time of the free length of path of the particles. Furthermore the author assumes that the initial perturbations occupy only a small volume compared to the dimensions of the system and occur at a sufficient distance from the boundaries of the plasma. Also no boundary-conditions need then be considered. Thus the author restricts himself to the investigation of a local instability which might occur in consequence of the directed velocities existing in the plasma and in consequence of inhomogenities of density, temperature and the magnetic field.

The distribution function of the steady state. In order not to complicate the rather extensive formulae the author restricts himself to the investigation of the steadiness of a cylindrically-symmetrical plasma. By using Maxwell's equations the following connection between the magnetic field H

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Stability of Plasma in a Strong Magnetic Field.

and the pressure $p = 2nT$ id found: $(1/r)\partial(rH)/\partial r = -(4\pi/H)\partial p/\partial r$ H, n, and T are cosidered here as asumed functions of r and as parameters on which the steadiness of the plasma depends. The small perturbations ∂f_1, $\partial \vec{E}$ and $\partial \vec{H}$ of the steady quantities f_1, $\vec{E}$, and $\vec{H}$ are described by a system consisting of Maxwell-equations and linearized Boltzmann-equations. In order to simplify further calculations a time dependence in the form $e^{i\omega t}$ is sought. Next, the determination of the dispersion equation is discussed and the so found dispersion equation is written down explicitly for the case that the wave-length λ is much greater than the Debye-radius and the Larmor-radius. In conclusion the dispersion-equation for following special cases is discussed. A) small curvature of the magnetic field, B) average curvature of the magnetic field. The formulae corresponding to these cases are written down, explicitly.

ASSOCIATION Mathematical Institute of the Academy of Sciences of the USSR.

PRESENTED BY

SUBMITTED

AVAILABLE Library of Congress

Card 2/2

AUTHORS: Bogolyubov, N.N., Academician, Zubarev, D.N., 20-117-5-16/54
Tserkovnikov, Yu. A.

TITLE: On the Theory of Phase Transition (K teorii fazovogo perekhoda).

PERIODICAL: Doklady AN USSR, 1957, Vol. 117, Nr 5, pp. 788-791 (USSR)

ABSTRACT: The theory of supraconductivity may be conveniently developed by starting from a model -Hamiltonian function (gamil'tonian) of the form $H = H_o + H_{int}$, $H_o = \sum_{k,s} (E(k)-\lambda)a^+_{k,s}a_{k,s}$,

$$H_{int} = -(J/V)\sum_{(k,k')} a^+_{-k,-1/2}a^+_{k,1/2}\, a_{k',1/2}a_{-k,-1/2}.$$ The summing up process in H_{int} is extended only to the momenta, k,k', belonging to the energy level $E_F - \omega < E(k) < E_F + \omega$. The author show, that in the case of this Hamiltonian it is possible to construct the thermodynamic potential $\Psi = F - \lambda N = -\theta \ln \mathrm{Sp}\, e^{-H/\theta}$ at $V \to \infty$ in an asymptotically exact manner. Moreover, a computation of this kind is also possible for the more general expression $H = \sum_{k,s} (E(k)-\lambda)a^+_{k,s} - \frac{1}{V}\sum_{(k,k')} J(k,k')a^+_{-k,1/2}a_{k,1/2}a_{-k',-1/2}$. Because of the circumstance, that the theory of phase transition furnishes examples which can be solved only incorrectly, the authors considered it appropriate to develop a method for the computation of the ther-

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modynamical functions of the Hamiltonian given just above, even the more, as applications to the theory of supraconductivity may emerge here. The authors here introduce the canonical transformation $\alpha_{k,1/2} = u_k\alpha_{k,0} + v_k\alpha^+_{k,1}$, $\alpha_{-k,-1/2} = u_k\alpha_{k,1} - v_k\alpha^+_{k,0}$, u_k, v_k denoting real functions, which are connected by the relation $u_k^2 + v_k^2 = 1$. The Hamiltonian thus transformed is given explicitly. Into the same shape is then transformed the statistical form of perturbation theory. The process of computation is followed step by step. The phase transition takes place at that temperature, at which one of the equation given here posesses a non-trivial solution. There are 3 references, 2 of which are Slavic.

SUBMITTED: November 13, 1957

Card 2/2

AUTHORS: Zubarev, D. N., Tserkovnikov, Yu. A. SOV/20-120-5-17/67

TITLE: On the Theory of Phase Transitions in a Non-Ideal Bose-Gas (K teorii fazovogo perekhoda v neideal'nom Boze-gaze)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 120, Nr 5, pp. 991 - 994 (USSR)

ABSTRACT: In this paper it is shown that the thermodynamical functions at $V\to\infty$, $N\to\infty$, $v = V/N = \text{const}$ can be computed with an asymptotic accuracy for a model Hamiltonian of the form

$$H = E_0 + \sum_k \varepsilon(k) b_k^+ b_k + \sum_{k_1 k} \frac{V(k-k')}{2V} b_k^+ b_k b_{k'}^+ b_{k'} + \sum_{k \neq k'} \frac{V(k-k')}{2V} b_k^+ b_{k'}^+ b_{-k'} b_{-k}$$

$$E_0 = \frac{V(0)}{2V} N(N-1)$$

b_k denotes the Bose- (Boze) operators, μ the chemical potential, $V(k)$ the Fourier component of the interaction energy. The relation $\varepsilon(k) = k^2/2m - \mu$ holds. This Hamiltonian differs from the complete Hamiltonian by the fact that only terms marked by two indices were kept. The operators are transformed

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On the Theory of Phase Transitions in a Non-Ideal Bose-Gas

canonically, which was suggested by N. N. Bogolyubov in 1947 in the theory of superliquidity:

$b_k = \lambda_k \beta_k + \mu_k \beta^+_{-k}$, $b^+_k = \lambda_k \beta^+_k + \mu_k \beta_{-k}$, $\lambda^2_k - \mu^2_k = 1$, $k \neq 0$,

where β_k and β^+_k denote the new Bose operators. The interaction is assumed to be sufficiently weak. The Hamiltonian resulting from this transformation is written down explicitly. Formulae for the thermodynamical potential and for the energy of elementary excitation are deduced. An expression is also written down for the spectrum of the elementary excitations, according to which the Bose gas transform at $T = T_{critical}$ from the non-superfluid state into the superfluid state. Finally the thermodynamical properties of a Bose gas are discussed. The authors acknowledge valuable suggestions given by N. N. Bogolyubov. There are 4 references, 3 of which are Soviet.

SOV/20-120-5-17/67

On the Theory of Phase Transitions in a Non-Ideal Bose-Gas

ASSOCIATION: Matematicheskiy institut im. V. A. Steklova Akademii nauk SSSR (Mathematical Institute imeni V. A. Steklov AS USSR)

PRESENTED: January 29, 1958, by N. N. Bogolyubov, Member, Academy of Sciences, USSR

SUBMITTED: January 21, 1958

1. Gases--Thermodynamic properties 2. Operators (Mathematics) 3. Transformations (Mathematics) 4. Phase transitions--Mathematical analysis

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24(8) SOV/2o-122-6-12/43

AUTHORS: Zubarev, D. N., Tserkovnikov, Yu. A.

TITLE: The Thermodynamics of Superconductors (Termodinamika sverkhprovodnikov)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 6,, pp 999-1oo2 (USSR)

ABSTRACT: The present paper investigates the thermodynamics of superconductors by means of Frëlikh's hamiltonian, in which electron-phonon interaction is explicitly taken into account. The thermodynamical perturbation theory is used for this purpose. Also the electron-phonon interaction constant is renormalized according to the method developed by N. N. Bogolyubov, whereby it is possible to improve development convergence. In this way the same advantages are obtained as in the case of zero temperatures. The initial hamiltonian is first written down explicitly. The canonical operator transformations are carried out like in the papers by N. N. Bogolyubov. Next, the hamiltonian is written down by using the new operators (obtained by transformation). The thermodynamic potential Ω is calculated according to the thermodynamic perturbation theory,

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The Thermodynamics of Superconductors SOV/2o-122-6-12/49

in which connection the ansatz $\Omega = \Omega_o + \langle R \rangle_c$ is used. Expressions for Ω_o and $\langle R \rangle_c$ and (in second approximation) a rather voluminous expression for Ω are derived. The energy of the elementary excitations of fermions and bosons are determined by the exclusion of certain graphs, which are given. The equations given here, together with the expressions for elementary excitations and with the condition for determining the chemical potential fully determine the coefficients of the initially given canonical transformations. As usual, these equations have a "normal" and a non-trivial solution for the superconductive state of the system. Finally, the thermodynamic functions are calculated. The authors thank N. N. Bogolyubov, Academician, for his useful advice, and V. A. Moskalenko for discussing this paper; they further express their gratitude to C. Bloch (K. Blokh) for placing the first printed copy of one of his papers at their disposal. There are 1 figure and 6 references, 4 of which are Soviet.

ASSOCIATION: Matematicheskiy institut im. V. A. Steklova Akademii nauk SSSR (Mathematics Institute imeni V. A. Steklov of the Academy of Sciences, USSR)

Card 2/3

S/155/59/000/02/025/036

AUTHORS: Zubarev, D.N., Tserkovnikov, Yu.A.

TITLE: On the Theory of the Phase Transition in Fermi Systems

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki, 1959, No. 2, pp.133-140

TEXT: The authors consider a system of Fermi particles with direct interaction. For the fundamental magnitudes characterizing the system the authors obtain equations, as they occur in the theory of superconductivity under use of the quaternary hamiltonian in which the interaction of the electrons through the phonons of the grid is replaced by their direct interaction, or in the investigation of the nuclear material with the aid of the quaternary hamiltonian. In (Ref. 1) and (Ref. 5) there were solved similar equations under the assumption that the matrix element of the interaction is constant and only different from zero in a close neighborhood of the Fermi surface. In the present paper the authors show that by application of solution methods for non-linear integral equations with branching it is possible to determine the solution of these equations under more general assumptions on the kernels of the equations. - There are 11 references, 9 Soviet and 2 American.

ASSOCIATION: Matematicheskiy institut imeni V.A. Steklova AN SSSR
(Mathematical Institute imeni V.A. Steklov AS USSR)

SUBMITTED: March 18, 1959

Card 1/1

TSERKOVNIKOV, YU.A.

24(0) SOV/30-59-2-42/60

AUTHOR: Khalatnikov, I. M., Doctor of Physical and Mathematical Sciences

TITLE: Investigations of Low-temperature Physics (Issledovaniya po fizike nizkikh temperatur)

PERIODICAL: Vestnik Akademii nauk SSSR, 1959, Nr 2, pp 98-100 (USSR)

ABSTRACT: The 5th All-Union Conference on this problem took place in Tbilisi from October 27 to November 1, 1958. It was attended by physicists from Moscow, Khar'kov, Leningrad, Tbilisi, Sverdlovsk, and Kiyev. 4 fields of low-temperature physics were discussed: superliquidity of liquid helium II, supraconductivity, antiferromagnetism, magneto-resistive effect. The following reports and communications were heard: A. A. Abrikosov, L. P. Gor'kov reported on the investigation of the properties of supraconductive alloys. A. A. Abrikosov, L. P. Gor'kov, I. M. Khalatnikov spoke of properties of supraconductors in the high-frequency magnetic field. D. V. Shirkov and Chen' Chun'-yan' and Chzhou Si-shin', two young Chinese scientists working at Moscow University, described investigations for determination of the influence exercised by the Coulomb (Kulon) interaction of charges on supraconductivity. V. V. Tolmachev explained the

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nature of the so-called collective excitations of the Bose type in supraconductors. D. N. Zubarev, Yu. A. Tserkovnikov spoke of the thermodynamics of supraconductors and B. T. Geylikman, V. Z. Kresin of the thermal conduction of supraconductors. Yu. V. Sharvin, V. F. Gantmakher reported on experimental work with supraconductors. N. V. Zavaritskiy spoke of the measurement of the anisotropy of thermal conductivity in the supraconductive state. In a series of reports problems of the superliquidity of helium were discussed, which was discovered in 1938 by P. L. Kapitsa and the theory of which was set up in 1941 by L. D. Landau. E. L. Andronikashvili and his collaborators investigated the properties of rotating helium. V. P. Peshkov spoke of the effect of the formation of the boundary between superliquid and non superliquid helium. Guan Vey-yan', collaborator of the Institut fizicheskikh problem (Institute of Physical Problems) investigated the properties of the so-called jump in temperature of Kapitsa. I. M. Lifshits, V. D. Peschanskiy investigated galvanomagnetic phenomena in strong magnetic fields for metals with open Fermi surfaces. N. Ye. Alekseyevskiy, Yu. P. Gaydukov experimentally investigated the resistance anisotropy of gold monocrystals in the

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magnetic field. L. S. Kan, B. G. Lazarev combine the presence of a temperature minimum with the structural state of the metal. M. Ya. Azbel' reported on the quantum theory of metallic conductivity in the alternating electromagnetic and constant magnetic field. A. S. Borovik-Romanov reported on the weak ferromagnetism in antiferromagnetic samples of $MnCO_3$. N. M. Kreynes, Ye. A. Turov investigated the magnetic anisotropy of the antiferromagnetic monocrystals $CuSO_4$ and $CoSO_4$. R. A. Alikhanov reported on neutronographic investigations of antiferromagnetics. K. I. Kondorskiy and collaborators reported on the susceptibility of nickel and nickel-copper alloys at low temperatures. M. I. Kaganov, V. M. Tsukernik reported on kinetic phenomena in ferromagnetics at low temperatures. A. I. Akhiyezer, V. G. Bar'yakhtar, and S. P. Peletminskiy spoke of computations of the relaxation of the magnetic moment in ferromagnetic dielectrics at low temperatures. T. I. Sanadze spoke of observation results of paramagnetic resonance of terbium in the $TbSO_3 \cdot 6H_2O$ nitrate. G. R. Khutsishvili gave a theoretical analysis of the orientation of the nuclear spin in the Overhauser (Overkhauser)

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effect in nonmetals. B. N. Samoylov, V. N. Reynov and collaborators reported on obtaining orientated nuclei. N. P. Bulatova, V. S. Kogan and B. G. Lazarev showed that hydrogen isotopes in solid state have different structures. I. A. Gindin, B. G. Lazarev, Kh. D. Starodubov and V. I. Khotkevich detected polymorphism in a number of metals at low temperatures. E. L. Andronikashvili, V. P. Peshkov and N. P. Malkov reported on the stage of development of foreign scientific research work in the field of low-temperature physics. At the end of the Conference P. L. Kapitsa spoke of his successful development of investigations in the field of low-temperature physics. The participants of the Conference visited the Institut fiziki Akademii nauk Gruzinskoy SSR (Physics Institute of the Academy of Sciences of the Gruzinskaya SSR) and the Physics Faculty of Tbilisi University as well as the building of the new research atomic reactor near Tbilisi.

Yu N. Tsirkovnikov

24(0)
AUTHOR: Chentsov, R.   SOV/53-67-4-7/7

TITLE: The Fifth All-Union Conference on the Physics of Low Temperatures (5-ye Vsesoyuznoye soveshchaniye po fizike nizkikh temperatur)

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 67, Nr 4, pp 743-750 (USSR)

ABSTRACT: This Conference took place from October 27 to November 1 at Tbilisi; it was organized by the Otdeleniye fiziko-matematicheskikh nauk Akademii nauk SSSR (Department of Physico-mathematical Sciences of the Academy of Sciences, USSR), the Akademiya nauk Gruzinskoy SSR (Academy of Sciences, Gruzinskaya SSR), and the Tbilisskiy gosudarstvennyy universitet im. Stalina (Tbilisi State University imeni Stalin). The Conference was attended by about 300 specialists from Tbilisi, Moscow, Khar'kov, Kiyev, Leningrad, Sverdlovsk, and other cities as well as by a number of young Chinese scientists at present working in the USSR. About 50 lectures were delivered which were divided according to research fields.
II. Supraconductivity. 13 lectures were delivered on this field of which two were experimental and the others theoretical. Reports on experimental investigations of supraconductivity were delivered by Yu. V. Sharvin and V. F. Gantmakher (IFP) and N. V. Zavaritskiy (IFP). The former investigated the structure of the intermediate state in monocrystals of pure tin, the latter measured the thermal conductivity of differently shaped orientated cylindrical gallium samples at 0.1 - 4.2°K. A. A. Abrikosov, L. P. Gor'kov and I. M. Khalatnikov (IFP) theoretically investigated the behavior of a superconductor in the high-frequency field. V. L. Ginzburg and G. F. Zharkov (FIAN) dealt with the microscopical theory, and Ginzburg discussed among other things the part played by fluctuations in phase transitions of the second kind. I. M. Lifshits (KhFTI) showed that it follows from the modern theory of supraconductivity in consideration of the anisotropy of metals that, in principle, the existence of supraconductors is possible which are supra-conductive only within a limited range of temperature (and not at all temperatures below the critical ones). B. T. Geylikman and V. Z. Kresin (IAE) investigated the electron- and phonon thermal conductivity of supraconductors by means of the microscopical theory at temperatures that are not very near absolute zero. M. V. Buykov and L. E. Gurevich (FTI AN SSSR) spoke about the surface energy on the boundary between the supraconductive and normal phases. D. N. Zubarev and Yu. A Tserkovnikov (Matematicheskiy institut AN SSSR - Mathematics Institute AS USSR) dealt with the thermodynamics of the supraconductive state (Froehlich-model). V. V. Tolmachev (MIAN) investigated the problem of collective excitations in a supraconductor. D. V. Shirkov (Ob"yedinennyy institut yadernykh issledovaniy - Joint Institute of Nuclear Research) spoke about consideration of Coulomb-interaction of electrons in semiconductors. The problem of consideration of the Coulomb interaction was discussed by Chen' Ch'un-hsien and Chou, Hsi-hsin (MGU).

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G/017/60/008/009/002/002
B011/B059

AUTHOR: Cherkovnikov, Yu. A.

TITLE: The Convectional Instability of a Rarefied Plasma

PERIODICAL: Fortschritte der Physik, 1960, Vol. 8, No. 9, pp. 528 - 548

TEXT: The present article is a translation from the Russian by F. Bartels. The author studied the convectional instabilities of a plasma which are due to local inhomogeneities of density, pressure, magnetic field, and other parameters. The calculations are approximative assuming the perturbations to occur in a volume that is small as compared to the dimensions of the whole system. In the first section of the article a conductive fluid, (the model of a plasma) in a straight magnetic field is discussed from the viewpoint of magneto-hydrodynamics. In this case, instability is due to gravity. Instabilities of a conductive fluid in a curved magnetic field have been studied in detail by Kadomtsev (Ref. 5), nevertheless, the author derived the stability condition for this case as

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The Convectional Instability of a Rarefied Plasma

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well. In the following a plasma is described by the hydrodynamics of a two-component system which consists of positive and negative ions. In the adiabatic case, neglecting friction between the components and assuming isotropic pressure with only electromagnetic forces acting upon the particles, fluctuations of density, pressure, and the magnetic field do not lead to an instability. Next, the influence of heat flow upon convectional processes in the above two-component plasma is investigated. The heat flow is found by solving the Boltzmann equation by expansion into powers of 1/H. Maxwellian distribution for the particles is assumed in zeroth approximation. The collision terms in the Boltzmann equation are neglected. Last, the rarefied plasma is described by the kinetic equations with the distribution being different from the Maxwellian. In conclusion the author thanks Academician N N. Bogoljubov for his interest in the investigation. There are 2 figures and 15 references: 9 Soviet, 1 German 4 US, and 1 British.

ASSOCIATION: Akad. Nauk SSSR, V. A. Steklov Inst für Mathematik, Abt Theor. Physik, T-2, Moskau (AS USSR, V. A. Steklov Institute of Mathematics, Department of Theoretical Physics, T-2, Moscow)

Card 2/2

TSERKOVNIKOV, Yu.A.

S/056/60/039/01/18/029
B006/B063

AUTHORS: Bogolyubov, N. N., Zubarev, D. N., Tserkovnikov, Yu. A.

TITLE: An Asymptotically Exact Solution of the Model Hamiltonian of the Theory of Superconductivity

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 1(7), pp. 120-129

TEXT: Using the model Hamiltonian by Bardeen, Cooper, and Schrieffer the authors have shown in a preceding paper (Ref. 1) that the thermodynamic functions of a superconducting system of the volume V are asymptotically exact if $V \to \infty$ and $N/V = \text{const}$ (N - number of particles). This was explained by the fact that each term of the perturbation-theoretical expansion, by means of which the correction to the solution was calculated, becomes asymptotically small when $V \to \infty$. The present paper shows that an asymptotically exact solution as the one given in Refs. 1 and 2 is obtained even if perturbation theory is not employed. It is further shown that the solution resulting for $V \to \infty$, which corresponds to the non-superconductive state (trivial solution), is not applicable at temperatures, θ, below

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An Asymptotically Exact Solution of the Model Hamiltonian of the Theory of Superconductivity

S/056/60/039/01/18/029
B006/B063

that of the phase transition, Θ_0, as it does not satisfy the conditions required for exact Green functions. It has already been said (Refs. 4 and 5) that there is no trivial solution for $\Theta < \Theta_0$. The authors first give and discuss the model and approximative Hamiltonians of the theory of superconductivity. The second part of the present paper shows that the whole chain of equations constructed for Green functions on the basis of the model Hamiltonian can be satisfied asymptotically. The last part shows that the trivial solution cannot be used below the critical temperature as it does not satisfy the conditions required for exact Green functions. A summary of the results of this work is given in conclusion. L. N. Gor'kov is also mentioned. There are 11 references: 7 Soviet and 2 US.

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ASSOCIATION: Matematicheskiy institut Akademii nauk SSSR
(Institute of Mathematics of the Academy of Sciences, USSR)

SUBMITTED: February 13, 1960

Card 2/2

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~~21(7)~~

SOV/20-130-2-14/69

AUTHOR: Tserkovnikov, Yu. A.

TITLE: On the Problem of the Convective Instability of a Plasma

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 2, pp 295 - 298 (USSR)

ABSTRACT: In a previous paper (Ref 1) the author investigated the convective instability of a plasma (caused by the spatial inhomogeneity of its parameters) on the basis of the kinetic equations without considering particle collisions. The present article deals with the same problem on the basis of simpler hydrodynamic equations. The author confines himself to an investigation of weak disturbances without considering boundary conditions, which fact is justified in studying convective instability. First, he uses an infinite-conducting fluid described by the equations of magnetohydrodynamics,

$$\rho\left\{\frac{\partial \vec{u}}{\partial t} + (\vec{u}\nabla)\vec{u}\right\} = -\nabla\left(p + \frac{H^2}{8\pi}\right) + \rho\vec{g}, \quad \frac{\partial \rho}{\partial t} + (\vec{u}\nabla)\rho + \rho \operatorname{div}\vec{u} = 0, \quad \frac{\partial p}{\partial t} + (\vec{u}\nabla)p + \gamma p \operatorname{div}\vec{u} = 0, \quad \frac{\partial \vec{H}}{\partial t} = \operatorname{curl}[\vec{u}\vec{H}] =$$

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On the Problem of the Convective Instability of a Plasma SOV/20-130-2-14/69

$= -(\vec{u}\nabla)\vec{H} - \vec{H}\,\mathrm{div}\,\vec{u}$. The fluid is assumed to be homogeneous along the magnetic field. Furthermore, $\vec{g} \perp \vec{H}$ holds (where $\vec{g}$ denotes gravitational acceleration), and the magnetic field is assumed not to be curved. The stability is investigated in linear approximation, and the disturbances are assumed to be small compared with the steady values of the respective quantities. Next, equations for the disturbance are written down. The gradients of the steady quantities are proportional to a small parameter μ. The condition

$$Q = \partial \ln \rho_0 / \partial \ln (p_0 + H_0^2/8\pi) - (p_0 + H_0^2/8\pi)/\gamma(p_0 + H_0^2/4\pi\gamma) > 0$$

is the condition of convective stability for a system that may be described by the above-mentioned equations. The convection is caused by gravitation; however, if the latter is ignored, the equilibrium condition assumes the form $\nabla(p_0 + H_0^2/8\pi) = 0$. Following this the author studies the complicated case of a binary system in adiabatic approximation (without considering heat flows). With the help of the aforementioned method it is shown that such a system is instable even in the absence of gravitation. Equations for the

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disturbances are written down, and are solved by expansion into the small parameter μ. After carrying out several operations, equations are obtained that describe two types of motions. The system described by these equations is instable if a current $\vec{j}_0 = -en_0\vec{v}_0$ is present only in the steady case. Finally, the effect upon convection processes due to heat flows is taken into account. In this case it is possible to linearize the equations and to expand them into a small parameter. Owing to the drift-like heat flows, heat instability is possible in this case, which was lacking in the aforementioned case. The condition of stability has the form

$$\frac{\partial \ln T_0}{\partial \ln p_0} < 1 + \frac{(\varkappa-1)}{2\gamma}, \text{ where } Q = 1 - \gamma + \gamma \partial \ln T_0/\partial \ln p_0$$

holds. The method described has a certain disadvantage in the case of strongly dilute plasmas, i.e., the Maxwellian distribution was employed as zeroth approximation with respect to 1/H. A more exact investigation is pointed out. The author thanks N. N. Bogolyubov for his interest in the present paper. There are 7 references, 4 of which are Soviet.

67560

On the Problem of the Convective Instability of a Plasma SOV/20-130-2-14/69

PRESENTED: July 16, 1959, by N. N. Bogolyubov, Academician

SUBMITTED: June 22, 1959

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24.2120

25176

S/041/61/013/002/004/007
B112/B229

AUTHOR: Tserkovnikov, Yu. A.

TITLE: Convectional instability of a rarefied plasma

PERIODICAL: Ukrainskiy matematicheskiy zhurnal, v. 13, no. 2, 1961, 190 - 209

TEXT: The author studies the convectional instability of various plasma models caused by a local-inhomogeneity of density, pressure, magnetic field, and other parameters. The author proceeds from the assumption that the region of disturbance is small as compared with the whole plasma. Parts 1 and 2 of the present work have a plasma model which is based on a conductive fluid in a rectilinear, or curvilinear magnetic field, respectively. The magnetohydrodynamic equations: (1.1) - (1.4)

$$\varrho\left(\frac{\partial \vec{u}}{\partial t}+(\vec{u}\nabla)\vec{u}\right)=-\nabla\varrho+\frac{1}{4\pi}[\operatorname{rot}\vec{H},\vec{H}]+\varrho\vec{g}, \qquad (1.1)$$

$$\frac{\partial \varrho}{\partial t}+(\vec{u}\nabla)\varrho+\varrho\operatorname{div}\vec{u}=0, \qquad (1.2)$$

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$$\frac{\partial p}{\partial t} + (\vec{u}\nabla)\, p + \gamma p \operatorname{div} \vec{u} = 0, \qquad (1.3)$$

$$\frac{\partial \vec{H}}{\partial t} = \operatorname{rot} [\vec{u}\vec{H}], \qquad (1.4)$$

satisfy this model; their solutions have the approximate form:
$\vec{\xi} = \vec{a} \exp i\,(\delta + \omega t)$ $(\vec{u} = \partial\vec{\xi}/\partial t)$.
The conditions of stability are:

$$\frac{\partial \ln \rho_0}{\partial \ln \left(p_0 + \frac{H_0^2}{8\pi}\right)} - \frac{p_0 + \frac{H_0^2}{8\pi}}{\rho\left(p_0 + \frac{H_0^2}{4\pi\rho}\right)} > 0$$

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and.

$$\frac{\partial \ln H_o}{\partial \ln r} < \frac{1 - \frac{H_o^2}{4\pi\rho p_o}}{1 + \frac{H_o^2}{4\pi\rho p_o}}$$

respectively. The plasma model of parts 3 and 4 of this work is a two-component fluid in the adiabatic and nondiabatic case, respectively. The basic equations are:

$$m_i n_i \left(\frac{\partial \vec{u}_i}{\partial t} + (\vec{u}_i \nabla) \vec{u}_i \right) = -\nabla p_i + e_i n_i \left(\vec{E} + \frac{1}{c} [\vec{u}_i \vec{H}] \right), \quad (3.1)$$

$$\frac{\partial n_i}{\partial t} + (\vec{u}_i \nabla) n_i + n_i \operatorname{div} \vec{u}_i = 0, \quad (3.2)$$

$$\frac{\partial p_i}{\partial t} + (\vec{u}_i \nabla) p_i + \gamma p_i \operatorname{div} \vec{u}_i = 0, \quad (3.3)$$

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$$\operatorname{rot}\vec{H} = \frac{4\pi}{c} e\,(n_i\vec{u}_i - n_e\vec{u}_e) + \frac{1}{c}\frac{\partial\vec{E}}{\partial t}, \tag{3.4}$$

$$\operatorname{div}\vec{E} = 4\pi e\,(n_i - n_e), \tag{3.5}$$

$$\frac{\partial\vec{H}}{\partial t} = -c\operatorname{rot}\vec{E}. \tag{3.6}$$

where the indices i and e are associated with the ions and electrons of the plasma. These equations have unstable solutions with a frequency of propagation of the interference approximately equal to $\pm\sqrt{\frac{m_2}{m_i}}\,(\vec{k}\vec{v}_o)$. The condition of stability in the nonadiabatic is as follows: $-\frac{\partial \ln T}{\partial \ln H_o} < \frac{H_o^2}{4\pi p_o}\left(1 - \frac{1}{2\gamma}\right) + \frac{1}{2}$

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The determinations of stability of part 5 are based on kinetic equations of the form:

$$\frac{\partial f}{\partial t} + (\vec{v}\nabla) f + \frac{1}{m}\left(\vec{E} + \frac{1}{c}\left[\vec{v}\,\vec{H}\right]\right)\nabla_{\vec{v}} f = 0$$

where $f(\vec{r}, \vec{v}, t)$ is the distribution function of the particles. The condition of stability obtained is: $-\frac{\partial \ln T}{\partial \ln H_o} < \frac{H_o^2}{8\pi\rho_o}$. The author compares the stability criteria obtained for various plasma models. He thanks Academician N. N. Bogolyubov for his interest in this work. There are 15 references: 10 Soviet-bloc and 5 non-Soviet-bloc.

SUBMITTED: February 10, 1960

Card 5/5

24,4500

S/020/62/143/004/014/027
B104/B102

AUTHOR: Tserkovnikov, Yu. A.

TITLE: The theory of a nonideal Bose gas at non-zero temperatures

PERIODICA: Akademiya nauk SSSR. Doklady, v. 143, no. 4, 1962, 832 - 835

TEXT: N. N. Bogolyubov has developed the theory of a nonideal Bose gas at zero temperature (Izv. AN SSSR, ser. fiz., 11, 67 (1947)). By means of two-time temperature functions a method is given to investigate a non-ideal Bose gas at non-zero temperatures. Green's functions are derived by calculating matrix elements by means of perturbation theory. The matrix elements satisfy the condition that no forbidden bands should be in the spectrum of elementary excitations. Thanks are due to Academician N. N. Bogolyubov, D. N. Zubarev and S. V. Tyablikov for discussions.

ASSOCIATION: Matematicheskiy institut im. V. A. Steklova Akademii nauk SSSR (Institute of Mathematics imeni V. A. Steklov of the Academy of Sciences USSR)

Card 1/2

ACCESSION NR: AP5001984 S/0020/64/159/006/1264/1267

AUTHOR: Tsytkovich, Yu. A.; Bogolyubov, N. N. (Academician)

TITLE: Second sound in a weakly-ideal Bose gas

SOURCE: AN SSSR. Doklady, v. 159, no. 6, 1964, 1264-1267

TOPIC TAGS: Bose gas, ideal gas, second sound, Green function, elementary particle collision, plasma theory

ABSTRACT: The problem considered here is the same as treated by N. N. Bogolyubov (preprint, Joint Institute of Nuclear Research, R-1395, 1963), who obtained in the hydrodynamic approximation (oscillation frequency of the system much lower than the collision fre-

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ACCESSION NR: AP5001984

collision frequency is low. The interaction is assumed small and the gas density is large. In this case the system of equations for the single-particle Green's function becomes equivalent to the random-phase approximation and can be easily evaluated. The asymptotic behavior of the Green's function as the time increases without limit is obtained, making the results applicable to plasma calculations. "The author thanks N. N. Bogolyubov, S. V. Tyablikov, and D. N. Zubarev for valuable discussions." This report was presented by N. N. Bogolyubov, Acad. AN SSSR, on 7 Feb 65.

ASSOCIATION: Matematicheskiy Institut im. V. A. Steklova Akademii nauk SSSR (Mathematics Institute, Academy of Sciences, SSSR)

SUBMITTED: 29Jun64 ENCL: 00

SUB CODE: NP, GP NR REF SOV: 005 OTHER: 000

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L 04203-67 EWT(1) IJP(c) WW

ACC NR: AP6030016 SOURCE CODE: UR/0020/66/169/005/1064/1067

AUTHOR: Tserkovnikov, Yu. A.

ORG: Mathematics Institute im. V. A. Steklov, Academy of Sciences SSSR (Matematicheskiy institut, Akademii nauk SSSR)

TITLE: Concerning second sound in a non-ideal bose gas

SOURCE: AN SSSR. Doklady, v. 169, no. 5, 1966, 1064-1067

TOPIC TAGS: boson, Green function, approximation method

ABSTRACT: An approximation procedure is presented in which the speeds C_1 and C_2 of "ordinary sound" and "second sound" are computed for the case of a condensed system of bosons. The Green function approach is used throughout. It is found that in this approximation, one loses the attenuation of the second sound and also the correction to the effective mass of the particles. This means that the interactions between the bosons must be regarded as weak, and that the particle density is high. The final expressions for the speed C_1 of ordinary sound and the speed C_2 of second sound have the properties that (a) C_1 is independent of the temperature in this approximation, (b) C_2 falls to zero, as it must in order to agree with experiment, when the number of particles in the condensed phase goes to zero, (c) the ratio of C_1 to C_2 comes out wrong in this approximation; to obtain a correct value for C_2/C_1 one must use either the hydro-

UDC: 536.758

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ACC NR: AP6030016

dynamic approximation of Bogolyubov, or else he must carry out a calculation based on the kinetic equations. The author thanks N. N. Bogolyubov for his discussion of the work. Presented by Academician N. N. Bogolyubov on 3 August 1965. Orig. art. has: 15 formulas.

SUB CODE: 20,12/ SUBM DATE: 27Jul65/ ORIG REF: 004/ OTH REF: 001

Card 2/2 LC

TSERKOVNIKOV, Yu.A.

Approximation of chaotic phases in the theory of nonideal Bose gas. Dokl. AN SSSR 159 no.5:1023-1026 D '64 (MIRA 18:1)

1. Matematicheskiy institut im. V.A. Steklova AN SSSR. Predstavleno akademikom N.N. Bogolyubovym.

TSERKOVNIKOV, Yu.A.

Second sound in a slightly nonideal Bose gas. Dokl. AN SSSR 159 no.6:1264-1267 D '64 (MIRA 18:1)

1. Matematicheskiy institut im. V.A. Steklova AN SSSR. Predstavleno akademikom N.N. Bogolyubovym.

TSERKOVNIKOV, Yu.A.

Theory of a nonideal Bose-gas at nonzero temperatures. Dokl. AN SSSR 143 no.4:832-835 Ap '62. (MIRA 15:3)

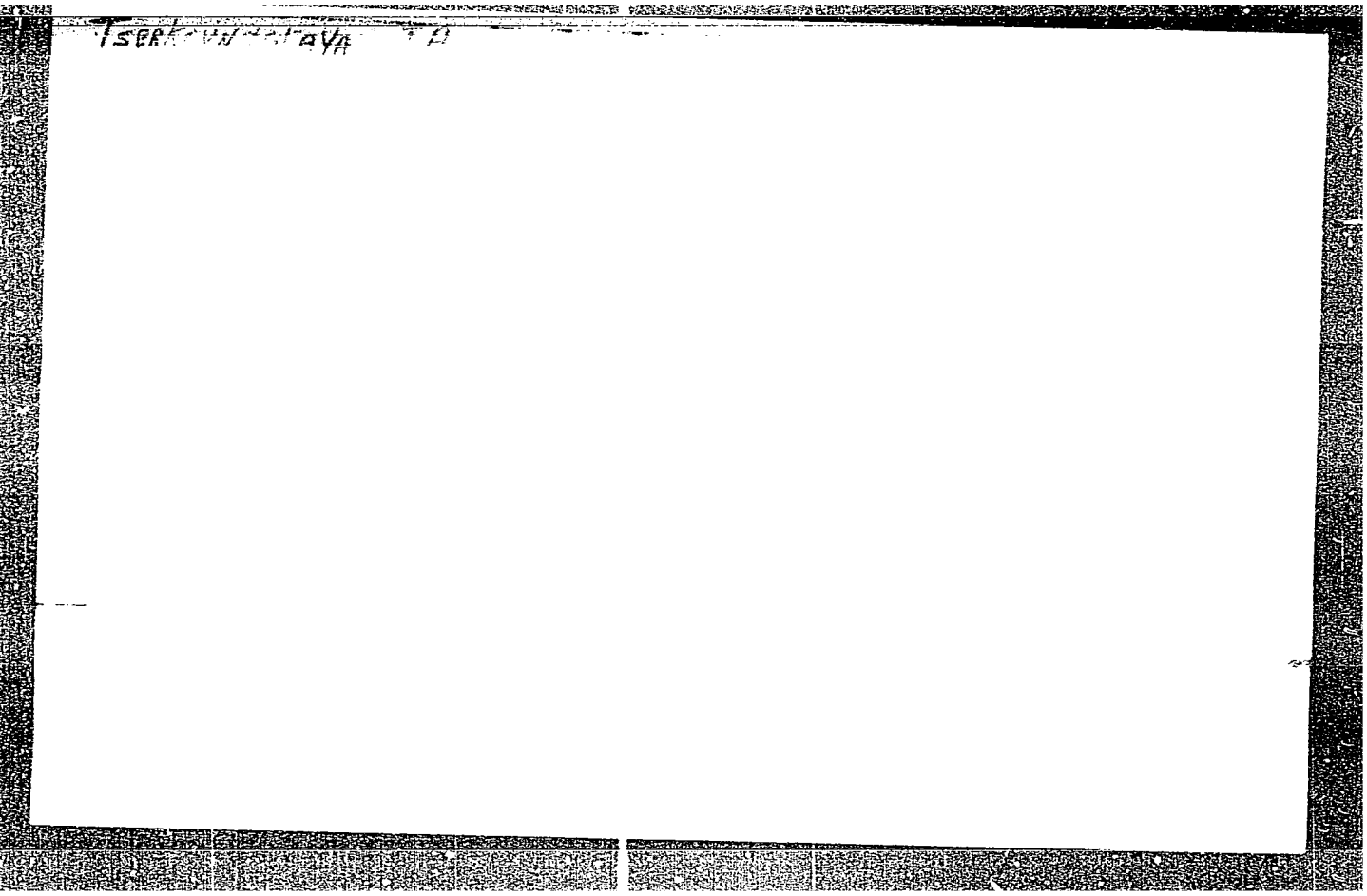
1. Matematicheskiy institut im. V.A.Steklova AN SSSR. Predstavleno akademikom N.N.Bogolyubovym.
(Quantum theory) (Gas dynamics)

GOL'DSHTEYN, M.N., prof.; ZHEREBTSOV, I.V.; TOL'SKAYA, S.Ye.; FRISHMAN, M.A.; LEVANKOV, I.S.; ROZENBERG, A.M.; BELASHOV, D.A.; TSERKOVNITSKAYA, A.I.; LAPIDUS, L.S.; YAKOVLEV, B.V.; GUBENKO, Ye.N.; VICHEREVIN, A.Ye., red.

[Preventing the deformation of tracks and structures overlaying mine workings.] Preduprezhdenie deformatsii puti i sooruzhenii nad shakhtnymi podrabotkami. Moskva. Transport, 1964. 65p. (Voprosy geotekhniki, no.8) (MIRA 18:2)

TSERKOVNITSKAYA, I.A.; BOROVAYA, N.S.

Determination of small amounts of zirconium in native materials. Vest. LGU 17 no.16:148-150 '62. (MIRA 15:9)
(Zirconium) (Rocks--Analysis)



Tserkovnitskaya, I.A.

137-58-3-6293

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 3, p 265 (USSR)

AUTHORS: Morachevskiy, Yu.V., Tserkovnitskaya, I.A.

TITLE: Separation of Small Amounts of Uranium (4) in the Presence of Niobium and Tantalum by Means of a Phosphate Method (Vydeleniye malykh kolichestv urana (4) fosfatnym metodom v prisutstvii niobiya i tantala)

PERIODICAL: Vestn. Leningr. un-ta, 1957, Nr 10, pp 152-154

ABSTRACT: A method has been developed whereby small amounts of U can be deposited in the presence of Nb and Ta. Precipitation is carried out in tartaric acid solutions containing Nb_2O_5, Ta_2O_5, and UO_2Cl_2. The U is first reduced by an amalgam of Zn, a collector is added to it [1 cc of 2 percent solution of $Zr(NO_3)_4$] and both U and the collector are precipitated by a 10 percent solution of $(NH_4)_2HPO_4$. After dissolving the precipitate in a 10 N solution of H_2SO_4, the U is titrated with an 0.01 N solution of NH_4VO_3 with phenyltranyl acid. Final separation is achieved when the concentration of the tartaric acid is 0.5 g or less for every 100 cc of the solution.

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P.K.

TSERKOVNITSKAYA, I.A.

MORACHEVSKIY, Yu.V.; TSERKOVNITSKAYA, I.A.

Separating uranium from aluminum, chromium, nickel, cobalt, and vanadium by means of inner electrolysis [with summary in English]. Vest. LGU 12 no.16:127-130 '57. (MIRA 10:11)
(Uranium) (Electrolysis)

AUTHORS: Morachevskiy, Yu. V., Tserkovnitskaya, I. A. 75-13-3-15/27

TITLE: Amperometric Titration of Tetravalent Uranium With Ammonium Vanadate (Amperometricheskoye titrovaniye chetyrekhvalentnogo urana vanadatom ammoniya)

PERIODICAL: Zhurnal analiticheskoy khimii, 1958, Vol 13, Nr 3, pp 337-339 (USSR)

ABSTRACT: The problem of the amperometric titration of uranium has not been satisfactorily solved. The polarographic characteristics of elements which can be used as oxidizing agents for the titration of tetravalent uranium were traced out. A method for the amperometric titration of uranium with trivalent iron was also described in publications (Ref 1). The authors of the present paper used ammonium metavanadate as oxidizing agent in the titration of tetravalent uranium. Vanadium is on this occasion reduced to the tetravalent stage at a dropping-mercury electrode at a potential of ~0,1V. Syrokomskiy (Ref 2) suggested a visual method of the vanadometric titration of tetravalent uranium with phenylanthranilic acid. This method is very sensitive, but it can only be employed in 5n - 13,5n sulfuric acid solutions; besides visual methods are unsuitable

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for the titration of colored solutions. It became evident that for ammonium metavanadate in 1n H_2SO_4, 1n HCl and 1n $HClO_4$ the limit current for vanadium is distinctly marked. When using these acids as medium, uranium can be amperometrically determined in a potential domain of 0 to -0,16 V. Before the titration a hydrogen current was for 30 minutes sent through the solution for removing the oxygen. A change of acidity of the solution in a domain of 0,1n to 1n (sulfuric acid, hydrochloric acid or perchloric acid) practically exerts no influence upon the results of titration. Thus uranium in concentrations below 2,5 γ/ml can be determined with satisfactory accuracy by amperometric titration with a 0,005n solution of ammonium metavanadate. The relative error on the average amounts to 1-3%. In titration with a more diluted solution of ammonium metavanadate the titration curve takes a much steeper course, which leads to higher errors in the determination of the end point. The presence of electrolytes (KCl, K_2SO_4, NH_4Cl) does not influence the determination of uranium in 0,1n sulfuric acid solution. The disturbing influence of iron can be removed by or-

Amperometric Titration of Tetravalent Uranium With Ammonium Vanadate

75-13-3-15/27

thophenantroline. This binds ions of bivalent iron to a stable bright-red complex which is not oxidized by pentavalent vanadium. Iron, prior to its masking, is reduced by liquid zinc amalgam in a sulfuric acid solution. The mean error of the amperometric determination of uranium in the presence of complexly bound iron is 3-6%. For binding lead, bismuth, chromium and nickel, which elements may disturb the determination by hydrolysis or the formation of sulfates, difficult to solve, complexon III is added to the solution. This keeps these elements complexly in solution and does not influence the results of the amperometric determination of uranium. There are 2 figures, 6 tables, and 2 references, 2 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova (Leningrad State University imeni A.A. Zhdanov)

SUBMITTED: February 8, 1957

Card 3/3

1. Uranium--Determination

5(2),5(3)

AUTHORS: Morachevskiy, Yu. V., Tserkovnitskaya, I. A. SOV/75-14-1-10/32

TITLE: Gravimetric and Photometric Determination of the Thorium Content in Uraninites with the Aid of Anthranilic Acid (Vesovoye i fotometricheskoye opredeleniye soderzhaniya toriya v uraninitakh pri pomoshchi antranilovoy kisloty)

PERIODICAL: Zhurnal analiticheskoy khimii, 1959, Vol 14, Nr 1, pp 55-59 (USSR)

ABSTRACT: Natural uraninites contain relatively small quantities of thorium. The authors employed anthranilic acid for the separation and determination of thorium. It was found that under certain conditions thorium can be precipitated quantitatively with anthranilic acid. An excess amount of reagent does not disturb the separation. The optimum p_H-value for the separation of small quantities of thorium in the presence of uranium is 4.2 - 4.4, uranium being maintained in a complex state in the solution by the aid of hydrochloride of hydroxyl amine. In this way also rare earths up to a ratio of CeO_2 : ThO_2 = 8 : 1 and lead are fully maintained in the solution. Thorium can be precipitated quantitatively, if its

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concentration is not smaller than 0.2 mg/50 ml. To determine thorium after its separation as anthranilate, the amino group of anthranilate is diazotized and coupled with β-naphthol, in which connection an orange-hued dye is formed. (Ref 8). In this way, the application range of this method can be considerably widened. The coloring of the solutions is determined photometrically. The determination of the ThO_2 content is carried out on the basis of a calibration curve. The error of this method is 3 - 5%, sensitivity is very high, and permits the determination of 0.04 γ Th/ml. This method of thorium separation and determination was tested on natural uraninites. A comparison of the results with those obtained from the determination of thorium by the aid of phenyl acetic acid showed a good agreement. The calibration curve for the photometric determination of thorium is illustrated. The procedure followed in the determination is described in all details.

Gravimetric and Photometric Determination of the Thorium Content in Uraninites with the Aid of Anthranilic Acid SOV/75-14-1-10/32

The determination of thorium after separation as anthranilate may also be effected gravimetrically after annealing the precipitate. There are 1 figure, 7 tables, and 8 references, 2 of which are Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University imeni A. A. Zhdanov)

SUBMITTED: September 1, 1957

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SOV/79-29-5-1/75

5(2)
AUTHORS: Morachevskiy, Yu. V., Tserkovnitskaya, I. A., Golubtsova, Z. G.

TITLE: Precipitation of Palladium With Dimethyl Glyoxime in the Presence of Ferric Oxide Salts (Osazhdeniye palladiya dimetilglioksimom v prisutstvii soley okisi zheleza)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 5, pp 1405 - 1408 (USSR)

ABSTRACT: In the present paper the authors investigated the influence of iron upon the precipitation of palladium from hydrochloric, sulfuric, nitric and chloric acid solutions of different concentration. It was first determined how far the acid concentration may be varied without decreasing the yield in palladium. The experiments indicated that the precipitation of palladium with dimethyl glyoxime is still almost complete in 1.5 normal chloric acid, nitric acid and hydrochloric acid solutions. In sulfuric acid solution a 100% precipitation of palladium still takes place from the 2-n solution. The increase in acidity of the solution influences the yield in palladium most in chloric acid and least in sulfuric acid solutions. The results obtained in the precipitation of palladium with dimethyl glyoxime in the presence of

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$FeCl_3$ in hydrochloric acid medium are summarized in table 1. Table 2 presents the results of the precipitation in the presence of $Fe_2(SO_4)_3$ in sulfuric acid medium, table 3 the results in the presence of $Fe(NO_3)_3$ in nitric acid medium and table 4 the results in the presence of trivalent iron in chloric acid medium. The results obtained permit the assumption that there is an interaction between dimethyl glyoxime, iron (III) and palladium in acid solutions in which connection a complex compound is formed. The nature of this compound is not yet clarified. At present the authors are carrying out the spectroscopic investigation of the system palladium-iron-dimethyl glyoxime. There are 4 tables and 2 references, 1 of which is Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: April 22, 1958

18 3/4 0D 1087

S/078/61/006/006/009/013
B110/B206

AUTHORS: Mikhaylov, V. A., Tergov, V. G., Molokhina, N. F.

TITLE: Extraction of nitrates of the rare-earth elements by means of tributyl phosphate in the presence of Trilon B

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 6, no. 6, 1961, 1457-1465

TEXT: Complex-forming substances have often been used for the chromatographic separation of rare-earth elements (REE). The effect of the complex-forming substance in the aqueous phase on the separation of the REE in the system: tributyl phosphate (TBP)-8 mole solution NH_4NO_3 - $Me(NO_3)_3$ - Trilon B has been studied. The following holds for the distribution of an REE nitrate present in one phase, to two phases of equal volume: $E = c_{org}/c_w$ (1), where E is the REE distribution coefficient in the presence of Trilon B; c_{org} the equilibrium concentration of the element in the organic phase; c_w the equilibrium concentration of the element in the aqueous phase. In the aqueous phase, the following ions are in

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Extraction of nitrates of the rare-earth ...

equilibrium: Me^{3+}, MeY^- and $Me(NO_3)_j^{3-j}$. Therefore, $E = c_{org}/([Me^{3+}]\{1 + \sum_1^j \varkappa_j [NO_3^-]^j\} + [MeY^-]$ (6) holds, where $\varkappa_j$ are the full stability constants of the nitrate complexes of the type $Me(NO_3)_j^{3-j}$, n the quotient from Trilon concentration in aqueous phase and initial REE concentration ($n = c_{tr}/c_{in}$): $n = 1/(1 + E) + (E/c_{in})\cdot E$ (12), where E can be considered an empirical constant. The following is written for the distribution coefficient of two REE nitrates $Pr(NO_3)_3$ and $Nd(NO_3)_3$:

$$S_{Pr,\,Nd} = \frac{\beta_{Pr}}{\beta_{Nd}} \frac{1}{S_0} \frac{K_{PrY^-}}{K_{NdY^-}} \frac{1 + \sum_1^j \varkappa_j^{Pr} [NO_3^-]^j}{1 + \sum_1^j \varkappa_j^{Nd} [NO_3^-]^j} \qquad (16)$$

where the degree of complex formation $\beta = [MeY^-]/c_w$ is the separation effectiveness without Trilon, $S_0 = E_0^{Nd}/E_0^{Pr}$. The following holds for great

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Extraction of nitrates of the rare-earth [illegible]

concentration of the complex-forming substance, $S_{Pr/Nd} = 1/(S_0 \cdot (K_{Pr/Nd} - 1)/(K_{PrNd} \cdot)$ (18). The Trilon concentration and the pH of the aqueous phase does not show here. For $S_0 >$ [illegible] the complex-forming substance can increase or reduce the separation coefficient in dependence on the instability constants; for $S_0 <$ [illegible] it always increases it. The above equation can also serve for calculating the biggest possible separation coefficient in the presence of the complex-forming substance. The oxides of the cerium group used for producing the nitrates had more than 99% of oxide of the main element, those of the yttrium group were chemically pure. The standard concentrations were determined by the oxalate method. Moreover, 8 molar NH_4NO_3 solution, and TBP washed out with soda solution and water (in equilibrium with the 8-molar NH_4NO_3 solution) were used, and the titer of the Trilon B solution was determined. Because of the high E_0 values the REE transition into the organic solvent took a quantitative course. The equilibrium concentration of the REE sum was determined by means of oxalate precipitation, the individual REE elements spectrochemically by

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Extraction of nitrates of the rare-earth ...

means of the MCP-67 (ISP-67) spectrograph, and for La-Lu by means of the SF-4 (SF-4) spectrophotometer. The pH values were determined by means of a lamp potentiometer with quinhydrone electrode. Table 1 shows the mean values from 4-9 parallel experiments without Trilon B. Inversion of the extractibility was established for heavy REE as well as for low HNO_3 concentration (H.McKay et al. J. Inorg. and Nucl. Chem. 9, 279 (1959))(Fig. 1). In conformity with the ionic radius, yttrium is placed between dysprosium and holmium. A. K. Lavrukhina and Chu P et-Chi (Ref. 8. Radiokhimiya 1, 530. (1959)) have shown that the Ce (III) distribution coefficient does not depend on the Ce (III) concentration for the TBP extraction from solutions with great ionic strength (4 mole HNO_3) in the concentration range concerned. Table 2 shows the results obtained under the same conditions in the presence of Trilon B. The pH value dropped from ~4.5 to ~2 through complex ion formation. β fluctuated between 95 and 100%. Fig. 2 shows the curves of the distribution coefficients calculated by means of the constant B obtained according to Eq. (12). The increase of the pH leads to the reduction of the distribution coefficient E through displacement of the equilibrium $Me^{3+} + H_2Y^{2-} \rightleftarrows MeY^- + 2H^+$

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to the right. The comparison of S and F_o in Table 8 shows that Trilon B does not facilitate the separation of the REE of the cerium group, but facilitates that of La-Nd considerably. The separation of the REE of the yttrium group is also facilitated. In the series Ho - Yb Trilon B raises the distribution coefficient by 2.5 to 3 times. S amounts thereby to 3 - 3.5 for a few neighboring elements. The authors thank V.K. Val'tsev for his collaboration. There are 4 figures, 8 tables, and 9 references: 4 Soviet-bloc and 5 non-Soviet-bloc. The references to the English-language publications read as follows: Ref. 3: D. Scargill et al.: J.Inorg. and Nucl. Chem., 4, 304 (1957). Ref. 6: C. V. Banks et al. Analyt. Chem., 30, 1792 (1958). Ref. 9: E. J. Wheelwright: J. Amer. Chem. Soc., 75, 4196 (1953).

ASSOCIATION: Institut neorganicheskoy khimii-Sibirskoye otdeleniye Akademii nauk SSSR (Institute of Inorganic Chemistry, Siberian Branch AS USSR)

SUBMITTED: May 9, 1960

Card 5/9

24394
S/186/60/002/002/013/022
E071/E433

21.4200

AUTHORS: Tserkovnitskaya, I.A. and Charykov, A.K.

TITLE: A study of the extraction separation of thorium from some elements using the method of marked atoms. I. The extraction of thorium phenylacetate with diethyl ether. A compound of uranyl ion with phenylacetic acid. The separation of thorium from uranium

PERIODICAL: Radiokhimiya, 1960, Vol.2, No.2, pp.222-230

TEXT: The object of the work was the development of a method of separation of thorium from some other elements (particularly uranium and rare earth elements) suitable for the extraction of thorium from its natural raw materials. The method was based on the precipitation of thorium with phenylacetic acid and the extraction of the precipitate by organic solvents. Solutions of thorium nitrate, a 2% aqueous solution of phenylacetic acid (AR) and diethyl ether were used as reagents. The distribution of thorium was controlled using radioactive thorium isotope UX_1 (Th^{234}, T = 24.5 days). All experiments were done at a constant ionic force equal 2, produced by ammonium chloride. The

A study of the extraction ...

precipitation was from hot solutions. The extraction was done at about 20°C. Optimum extraction conditions: the volume of ether should equal the volume of the aqueous phase, the concentration of thorium should be of the order of 1 mg per 20 ml of the solution. It was found that the precipitated thorium phenylacetate possesses specific properties, namely it is extracted by some organic solvents without changing its structure, i.e. without dissolving in the organic phase. A complete extraction of thorium phenylacetate with diethyl ether takes place in the pH range of 3 - 5. From the organic phase thorium can be quantitatively re-extracted with dilute (1:10) mineral acids. The dissociation constant of phenylacetic acid and its distribution constant between diethyl ether and water at an ionic force of the solution equal 2 and a temperature of 20°C were found to be $(8.1 \pm 0.4) \times 10^{-5}$ and 34 ± 2 respectively. On studying the possibility of the separation of thorium from uranium, it was established that from a solution containing 0.1 M of phenylacetic acid, 2M of ammonium chloride and a concentration of uranyl ion of about 5 mg/ml, a precipitate is formed beginning from a pH of 2.6 and above. The composition of the precipitate corresponds to the

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formula $UO_2(C_6H_5CHOO)_2 \cdot C_6H_5CH_2COONH_4$. It is a fine, light yellow crystalline powder, stable in air. It melts at 220°C with a noticeable decomposition. It is soluble in water without a noticeable hydrolysis. The solubility at 90°C is about 2.8 g/l. It is practically insoluble in diethyl ether. The above property was used for the separation of thorium from considerably larger quantities of uranium. It was found that in order to obtain a complete precipitation and extraction of thorium, the pH of the solution should be above 3. However, if uranium is present in larger quantities, the extraction of thorium is difficult, therefore the method of direct separation of uranium and thorium by extraction of thorium phenylacetate with ether is limited to similar concentrations of thorium and uranium. At higher concentrations of uranium a satisfactory separation can be obtained in the presence of hydroxylamine (for combining uranium into a complex) at a pH of about 4.5. There are 2 figures, 3 tables and 2 references: 1 Soviet-bloc and 1 non-Soviet-bloc.

SUBMITTED: June 17, 1959

Card 3/3

TSERKOVNITSKAY, I.A.; CHARYKOV, A.K.

Tracer study of the possibility of seperating thorium from certain elements by extraction. Part 1: Extraction of thorium phenylacetate with ethyl ether. Compound formed by the uranyl ion with phenylacetic acid. Separation of thorium from uranium. Radiokhimiia 2 no.6:222-230 '60. (MIRA 14:4)

(Thorium)
(Uranyl compounds)
(Uranium)

TSERKOVNITSKAYA, I.A.; BOROVAYA, N.S.

Behavior of zirconium during the extraction of uranium and niobium diethyldithiocarbamates. Uch. zap. LGU no.297:96-98 '60.
(MIRA 13:11)

(Zirconium) (Carbamic acid)

TSERKOVNITSKAYA, I.A.; CHARYKOV, A.K.

Development of a scheme for the analysis of uraninite. Uch. zap. LGU no.297:109-118 '60. (MIRA 13:11)
(Uraninite)

MORACHEVSKIY, Yu.V.; TSERKOVNITSKAYA, I.A.; GRIGOR'YEVA, M.F.

New variant of the cupferron method for extracting uranium. Uch. zap. LGU no.297:119-124 '60. (MIRA 13:11)
(Uranium) (Cupferron)

TSERKOVNITSKAYA, I.A., KALININ, A.I., MORACHEVSKIY, Yu.V.

Amperometric titration of gallium with a cupferron solution. Zav.lab. 26 no.7:797 '60. (MIRA 13:7)

1. Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova.
(Gallium--Analysis)

MORACHEVSKIY, Yu.V. [deceased]; TSERKOVNITSKAYA, I.A.

Photometric determination of tetravalent vanadium with acid chrome blue K. Zhur. anal. khim. 16 no. 1:106-107 Ja-F '61. (MIRA 14:2)

1. A.A. Zhdanov Leningrad State University.
(Vanadium—Analysis) (Acid chrome blue K)

TSERKOVNITSKAYA, I.A.; PRUDNIKOV, Ye.D.; KUSTOVA, N.A.

Effect of organic complexing agents on the oxidation-reduction potential of the V^{4+}/V^{3+} system. Vest.LGU 16 no.10:133-138 '61. (MIRA 14:5)

(Vanadium compounds) (Oxidation-reduction reaction) (Complex ions)

S/186/62/004/002/006/010
E075/E136

21.4200

AUTHORS: Tserkovnitskaya, I.A., and Charykov, A.K.

TITLE: Study of the possibility of extractive separation of thorium from some other elements by the method of radioactive tracers

PERIODICAL: Radiokhimiya, v.4, no.2, 1962, 184-188

TEXT: The authors aimed to develop a method giving a more complete separation of Th and the rare earth elements than that described previously by them (Ref.1: Radiokhimiya, v.2, no.2, 1960, 222) by considering the possibility of preventing coprecipitation during the extraction. It was found that Th can be quantitatively separated from La by extracting thorium phenylacetate with ethyl ether in the pH range of 3 to 4.5. The separation of Th from large amounts of Ce can be achieved successfully by extraction in the presence of hydroxylamine. Correct pH for the extraction depends on the ratio of Ce to Th and tends towards the lower (acid) values when the ratio increases. Many cations including K, Na, Hg^{2+}, Pb^{2+} and some

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Study of the possibility of ...

others do not affect the extraction. Certain cations such as Al^{3+} and Fe^{3+}, even in negligible quantities, make the extraction more difficult especially at higher than 4 values of pH. It is therefore necessary to remove both Al and Fe from the mixture before the extraction. The new method is suitable for a rapid and complete separation of small quantities of Th (of the order of 2 mg) and gives a possibility of carrying out a volumetric finish. The authors intend to apply the method for the determination of small amounts of Th in various mixtures containing U, and the rare earth elements.
There are 7 tables.

SUBMITTED: June 17, 1959

Card 2/2

MORACHEVSKIY, Yuriy Vital'yevich [deceased]; TSERKOVNITSKAYA, Irina Aleksandrovna; KNIPOVICH, Yu.N., kand. khim. nauk, otv. red.; POZDYSHEVA, V.A., red.

[Principles of the analytical chemistry of the rare elements] Osnovy analiticheskoi khimii redkikh elementov. Leningrad, Izd-vo Leningr. univ., 1964. 182 p. (MIRA 18:2)

L 50508-65 EWT - EW TR/0153/64/007/004/0544/0550

ACCESSION NR: AP5018631

AUTHOR: Tserkovnitskaya, I. A.; Charykov, A. K.

TITLE: Some properties of organic salts of thorium

SOURCE: IVUZ. Khimiya i khimicheskaya tekhnologiya, v. 7, no. 4, 1964, 544-550

TOPIC TAGS: thorium, organic salt

ABSTRACT: The compositions of salts of thorium with organic acids of various [illegible] aliphatic-aromatic acids, various substituted [illegible] as well as a function of the pH of the precipitation. [illegible] the organic salts of thorium [illegible] dissolution in organic solvents. [illegible] of organic [illegible] len.

[illegible] Leningradskiy gosudarstvennyy [illegible] Leningrad State University

Card 1/2

L 56568-65

ACCESSION NR: AP5018631

SUBMITTED: 21Sep62	ENCL: 00	SUB CODE: GC
NO REF SOV: 003	OTHER: 012	JPRS

Card 1/2

KOMOLOVA, N.G.; TSERKOVNITSKAYA, I.A.

Amperometric titration of niobium with pyrocatechol. Zav. lab. 30 no.11:1329-1330 '64 (MIRA 18:1)

1. Leningradskiy gosudarstvennyy universitet.

TSERKOVNITSKAYA, I.A.; YEPIMAKHOV, V.I.

Determination of Ge, Se, and Sn in semiconductor materials by oscillographic polarography. Zav.lab. 31 no.10:1178-1179 '65. (MIRA 19:1)

1. Leningradskiy gosudarstvennyy universitet.

L 04492-67 EWT(m)/EWP(j)/T DS/RM

ACC NR: AF6017112 SOURCE CODE: UR/0054/65/000/003/0101/0106

12
11
B

AUTHOR: Tserkovnitskaya, I. A.; Yepimakhov, V. N.

ORG: none

TITLE: High-frequency alkalimetric titration of polyphenolgermanium acids

SOURCE: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 3, 1965, 101-106

TOPIC TAGS: organogermanium compound, amperometric titration, polarographic analysis

ABSTRACT: Based on polarographic data, it was found that complex compounds of germanium with polyphenols are reduced in a acidic medium on a mercury drop electrode. The highest maximum current was observed in a hundredfold excess of organic reagent with respect to germanium. The composition of the complexes investigated was established by amperometric titration in an alkaline medium with respect to the reduction current of germanium. The germanium: polyphenol ratio in the complex was 1:3. It was of interest to compare results on a study of complexes using the polarographic method with those obtained from high-frequency noncontact titration, since in this case there are no electrochemical processes at the interfaces (electrode processes), and the electrochemical

UDC: 546.289:543.241

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properties of the entire chemical system enclosed between the electrodes become manifest. Measurements were made with an instrument of the Pungor system. The capacity of the titrimeter together with the mixer motor was 48 watts; the working frequency was upwards of 100 megacycles. The experimental conditions were as follows: 10 ml of $1 \cdot 10^{-2}$M GeO_2 solution was poured into a cell, and then solutions of pyrocatechin or pyrogallol were added until different ratios of germanium to polyphenol concentration were attained, from 1:1 to 1:200. The volume in the beaker was brought to 70 ml in order that the level of the solution would be above the upper edge of the electrode. This was necessary to eliminate the effect of variation in solution volume on microammeter readings. The resulting mixtures were titrated with 0.1 N NaOH solution. Another series of experiments were conducted in parallel, using the potentiometric titration of germanium compounds with polyphenols, employing a glass electrode. Measurement of solution solution pH values were made on the LP-58 pH-meter, calibrated with respect to a saturated solution of potassium carbonate with pH = 3.59

As a result of the titration using sodium hydroxide, curves were obtained which had sharp points of inflection. Beginning with a